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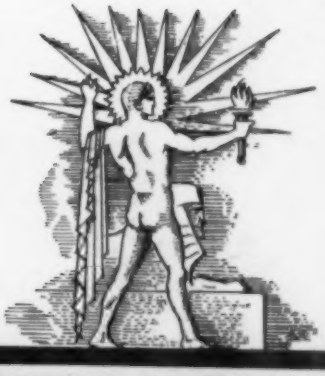
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



NOVEMBER 16, 1935

Off Relief

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVIII *No. 762*

The Weekly Summary of Current Science

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DO YOU KNOW?

Ethiopian natives sometimes mark trails by tying knots in flexible saplings.

Danish authorities are revising the spelling of Eskimo place names in Greenland.

Poultry men are now told how to feed hens so as to produce lighter yellow or darker orange egg yolks.

The marten, one of the United States' most valuable fur animals, requires nine months to produce a litter of young.

Texas longhorn cattle, now rare, enjoy protection with big game animals on the Wichita game preserve in Oklahoma.

The late explorer Dr. Peter Kozlov bequeathed to the Soviet government the most valuable collections from his Central Asiatic expeditions.

About 20 tropical and sub-tropical fruits are commercially grown in the United States, but Florida sees wider possibilities, since more than 600 such fruits are known.

Mass production was a familiar idea to Roman industry 2,000 years ago.

Television receiving sets were first shown to the German public at the radio show this year in Berlin.

Serum treatment has reduced deaths due to snake bite in the United States, from over 14 to less than four per cent.

The claim that Vikings reached America almost five centuries before Columbus was first made by Prof. Karl Rafn in 1837.

Because the French scientist Parmentier made the potato popular in France long ago, his grave is covered with potato plants.

When the gray squirrel population becomes too dense in a region to suit the squirrels, there is a huge migration with much excitement.

Three more kinds of American waterfowl are in danger of extinction unless saved: the white pelican, giant blue heron, and black-crowned night heron.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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SEISMOLOGY

Why is an earthquake often followed soon by another in the same region? p. 316.

ZOOLOGY

What do bears like to eat? p. 310.

METALLURGY

New Method Makes Aluminum Plating on Steel Possible

Inventor of Chromium Plate Process Now Announces Possible Substitute for Tin in Cans for Food

THE LONG-sought method of applying a non-corrosive coating of aluminum to steel and other ferrous materials appears to have been solved on a commercial scale by Prof. Colin G. Fink, electrochemist of Columbia University.

The new aluminum plate offers advances in such diversified fields as the packaging of foods in cans, building construction, the theater, railroading, and the fabrication of electric toasters and heaters.

Prof. Fink, while holding many basic patents in the field of electrochemistry, is perhaps best known for his process of chromium plating, on which many million dollars have been spent in developing work to bring it to its present state of perfection.

As described in recently issued British patents, Prof. Fink's aluminum plating process for steel or iron consists of inserting the properly pretreated metal into a bath of molten aluminum. Past troubles with coating iron wire or plate with aluminum, explains Prof. Fink's patent, arose in part from the presence of the high surface tension film of aluminum oxide on the top of the molten aluminum metal. The oxide would prevent the aluminum metal from coating the steel or iron surface. By special heat treatment of the steel this difficulty has finally been overcome.

The ductility of the aluminum-plated steel is such that the plated material may be bent or crimped without cracking the plated surface. The aluminum coating may be dyed in a variety of shades with both organic and inorganic dyes. Corrosion tests exposing the plate to various salts and acids show no disintegration of the coating.

Uses foreseen for the aluminum plate indicate a new entrant into the competitive field of non-corrosive coatings for metals and even non-corrosive alloys.

The canning of food, now accomplished by tin plate, should receive a particularly serious challenge from the new product. Aluminum, rather than tin plated cans, will probably be the point where the public will come into closest contact with the new development. Aluminum, one need only recall, costs only one-seventh as much per cubic foot as does tin.

Another field of exploitation for aluminum plating is that of window and other screening in tropical climates.

Fire-proof curtains for theaters offer still another possible use. While the present-day asbestos curtains afford partial protection, their material will not withstand, without crumbling, the high temperatures that a woven screen of aluminum-plated iron wire will. Heater coils for toasters provide another possibility.

And finally there is perhaps the largest field of all, metal roofing and partitions in the construction industry, awaiting the coming of a non-corrosive plating on sheet iron or steel.

Technically the success of the method depends on something else besides inserting the iron or steel below the surface of the molten aluminum bath. The surface of the steel must be treated with hot hydrogen gas prior to the plating stage.

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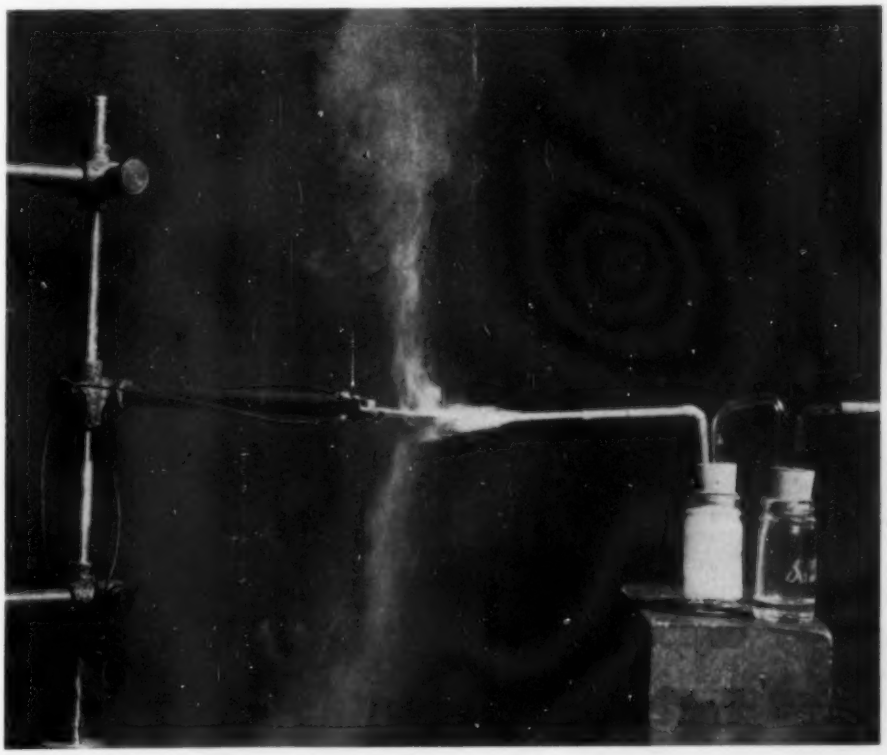
ARCHAEOLOGY

Find Bowl Used in American Ball Games 800 Years Ago

DISCOVERY of a large oval "bowl" where prehistoric America's exciting games were played 800 years ago is announced by Dr. Harold S. Colton of the Museum of Northern Arizona.

The discovery, pronounced amazing, was made in northern Arizona near Flagstaff, by a joint expedition of the Museum and Arizona State Teachers College of Flagstaff, led by J. C. McGregor.

The find surprises archaeologists, because never before has it been realized that ball games—national sport of



WORLD'S MOST COSTLY ELECTRIC FAN

Engineers of the Bell Telephone Laboratories recently demonstrated the real, but unseen, vibration of quartz crystals that control the frequency of radio stations, by making one of them serve as an electric fan. Shown above is the exhibit wherein a smoke stream splits into two parts on encountering the flat surface of the quartz crystal. Despite the fact that the vibration is only three 100,000ths of an inch or about the thickness of a layer of air eight atoms deep it moves the air with a velocity of seventeen feet per second.

Mayas, Aztecs, and other Indians of Mexico—were popular over so wide an area of ancient America.

The game court now excavated is an oval bowl about 100 feet long and 45 feet wide, with slightly pointed ends. The sloping sides, Dr. Colton said, must have been seven or eight feet high, and the floor was level. Entrances were in the north and south walls, and a goal made of four rocks in the floor was at the south end. The plan resembles ball courts used in prehistoric Mexico.

Still uncertain as to what kind of game the northern Arizona Indians played in their elaborate bowl centuries ago, the Museum-College expedition is excavating another game court located east of Flagstaff.

A well-known Indian ruin in this region, long believed to be an ancient reservoir, is now recognized as another of the courts. In southern Arizona, last winter, an expedition first discovered that the Mexican-type ball courts spread north into what is now the United States.

"That the courts should be found as far north as Flagstaff," said Dr. Colton, "is indeed striking."

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PHYSIOLOGY

Sex Gland Cancer Produces Female Hormone in Male Body

EVIDENCE that male human beings under certain conditions will produce large amounts of a hormone identical with that occurring in the body fluids of women during pregnancy was presented to the American College of Surgeons by Dr. Herbert M. Evans, Professor of Biology at the University of California.

Dr. Evans stated that with the collaboration of Dr. Miriam E. Simpson he has been able to demonstrate that when the male sex glands are invaded by tumor, a hormone is produced which reacts exactly the same on other animals as "prolan," the hormone produced in women during the development of the embryo. In other words, the rapidly proliferating tumor cells lead to the same result as the proliferating cells of a fetus, although one occurs in the male and the other in the female.

This determination, it was pointed out, indicates the necessity for extreme care in measuring the strength of hormone dosage. When experiments on the hormone from males with tumor of the gonad were first started it was believed that this substance was far stronger in its effects than "prolan" from pregnant women. The conclusion was that it compared in strength of effect with the sex-stimulating hormone from the anterior lobe of the pituitary gland or the hormone from pregnant mares.

Checked Measurements

However, suspicions were later aroused as to the accuracy of the unit measurements commonly used in hormone administration. Careful checks were made and these revealed that when care was taken to equate the unitage of "prolan" and the hormone from males with tumor of the gonad, the effects were identical. With the cooperation of Drs. Horlein, Schulemann and Laqueur of the chemical laboratories of the Interessen Gemeinschaft at Elberfeld, Germany, it was shown that both hormones led to the same stimulation of the ovaries in immature rats. It was found that when immature female rats were given between 5,000 and 20,000 units of either hormone, ovaries weighing 200 or more milligrams were produced.

Tried on Pigeons

A recheck of the comparative effects of the two hormones on pigeons indicated that in this case also when the true unit value of "prolan" was determined it yielded the same gonad stimulation as the newly-obtained hormone from men suffering from the disease, *teratoma testis*. The effect of the two hormones is also the same when given to rats lacking the pituitary, both male and female.

In conclusion Dr. Evans said, "Ovarian weights will increase fairly rapidly following injections of the pregnancy hormone prolan in doses of 50 to 100 times the minimum rat unit. Very slight increases occur as the dose is increased up to 5,000 rat units. But when the dose is raised to 10,000 or 20,000 units, the ovaries increase to giant size, comparable to that achieved by administration of the male tumor hormone or ordinary doses of extracts from sheep pituitary glands. In every case the male tumor hormone shows its close relationship to the female pregnancy hormone prolan."

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GEOLOGY

Movie Compresses Millions Of Years Into Minutes

MILLIONS of years are compressed into minutes of viewing time, in a series of remarkable new scientific motion pictures that have just had their premiére showing in Washington, D. C. They portray, by a well-thought-out combination of pictures taken out of doors and moving animated diagrams, a number of phases of the geologic processes that have made, and are still making, the earth we live on. A running fire of explanation is "talked on" to the film, so that it delivers its own well-synchronized lecture.

Although these pictures were designed primarily for use in college geology classes, the way the first general audience who saw them "ate them up" indicated that they will find wide use elsewhere. It is already planned to show them in the C.C.C. camps.

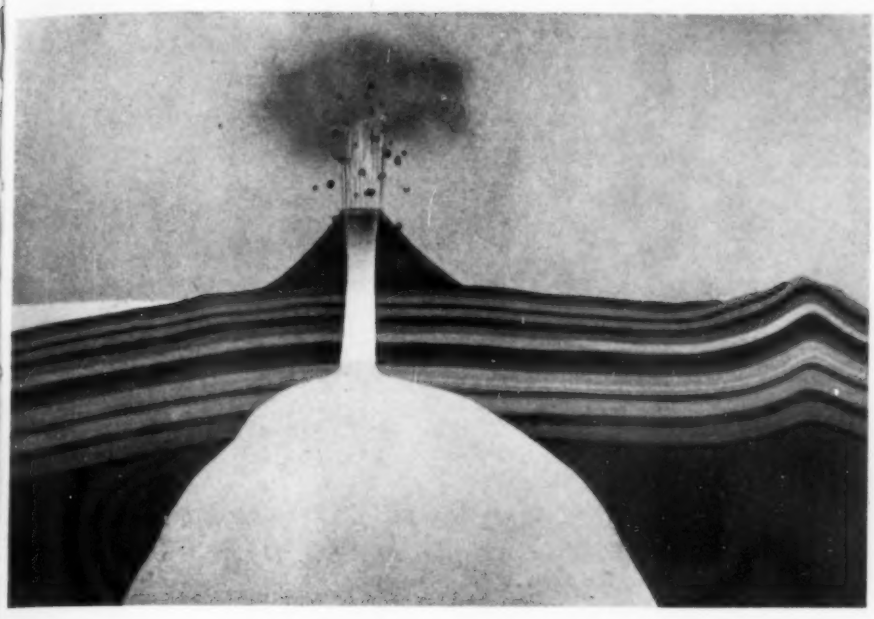
It is appropriate that the men of the C.C.C. should be among the first to see them, since some of them had a considerable part in the production. The pictures are the products of collaborative effort on the part of the U. S. National Park Service, the University of Chicago, and Erpi Picture Consultants. The Service provided the actual geology, the University developed the script, and Erpi supervised the work of the corps of C.C.C. men who made the animation drawings and developed the films.

Incessant Change

The films show dramatically and vividly the incessant change that is the real secret of the seemingly unchanging ocean, the transitoriness of the "everlasting hills." The phenomena range from the swishing fall of the rain and the incessant gnawing tooth of erosion to the slow, mighty creep of glaciers and the slower but even mightier creep of the earth's crust to form mountain ranges. Waterfalls thunder, geysers roar, volcanoes rage.

What will impress the observer most, probably, is the manifold activities of water. These films bring home anew the often-emphasized fact that the "universal solvent" long sought by the ancients is really to be found in the common water they disregarded in their search. Water is shown cutting down the earth banks of streams, wearing away the solid granite of mountains. Water insinuates itself into limestone strata and opens up tremendous awesome caverns.

Water forms wedges of ice that split



HOW A VOLCANO SPROUTS

One of the new geology films shows how a pencil of magma, working its way to the surface, develops the local supply of lava that becomes the working capital of a volcano.

rocks, slow-heaving rams of ice that pile up boulders on lake shores, massive rivers of ice that sculpture valleys like the Yosemite. Water is locked secretly in the crystals of the dry unchanging rocks, and water leaps bellowing as volcanic steam when stones visit the sky and rock runs in cataracts of lava. The history of earth, these films demonstrate impressively, might well be called the history of water.

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PHYSICS—ASTRONOMY

Einstein's Relativity Theory To be Tested in Sun's Eclipse

THE NEXT eclipse of the sun will find Prof. Albert Einstein's theory of relativity again being tested to see whether it or its new challenger—the theory of Sir Shah Sulaiman, Indian judge and mathematician—better predicts the bending of star light grazing the sun's surface.

This new test is part of the latest phase of the scientific controversy over the new relativity theory of Sir Shah, who while chief justice of the High Court at Allahabad, India, is also an Oxford-educated mathematician.

The new stage consists of a defense, by Sir Shah, of previous criticisms of his revolutionary theory which would upset the work of Prof. Albert Einstein; and a counter-criticism of Sir Shah's defense by D. R. Hamilton, Princeton mathematician. (*Science,* Nov. 1)

Mr. Hamilton, working under the direction of Prof. H. P. Robertson, mathematical physicist and associate of Prof. Einstein, presented, last March, the first critique of the Sulaiman theory which the Indian justice-mathematician now defends.

The new theory, as originally announced, sought to provide some link between the classical mechanics of Sir Isaac Newton and the modern Einstein relativistic mechanics. Using ordinary mechanics, Sir Shah has attempted and built up equations which as a first approximation reduce to those of Newton, and as a second approximation reduce to those of Einstein's relativity.

Also, as originally presented, the Sulaiman theory postulated the existence of tiny particles—gravitons—on which the pull of gravity depended.

In part, Mr. Hamilton's original criticism was based on these gravitons which, he said, was a concept originally put forward by LeSage in 1764 and long since discarded.

Sir Shah in his new reply states, "I must remove the misapprehension that my mathematical theory is based on the assumption of gravitons." They are convenient, he adds, but not at all necessary for the theory.

Still another criticism of Sulaiman's original theory by Mr. Hamilton was the fact that on working out the calculations it turned out that the planet Mercury after 300 years would no longer be swinging about the sun in an elliptic orbit as it does but would change to a parabolic orbit and fly off into space.

"Fallacious"

Replying to this critique, Sir Shah points out that calculations like those of Mr. Hamilton, based on yearly increases on a large number of revolutions, are fallacious. Curves based on approximate solutions like those of the new theory, Sulaiman adds, are intended merely to represent only a geometrical picture of the orbit and then only to within the limits of whatever approximations are taken.

"Such a method," he points out, "does not at all profess to give the whole history of the revolutions of a planet over a long period."

He goes on to add that Einstein's equations fall down also when applied to the same test of a large number of revolutions.

"The obvious explanation," Sir Shah concludes, "is that the geometrical shape of the orbit is one thing and its whole history through its spiral path is quite another."

The next solar eclipse will furnish a final test of the relative merits of the Sulaiman and the Einstein theories for both predict by what amount the deflection of light from distant stars will bend if it passes close to the sun, declares the Indian magistrate.

"Still Found Wanting"

Mr. Hamilton, replying to Sir Shah's reply, points out that he soon will publish "a complete account of the numerical perturbations predicted by Sulaiman's formulae" and strongly implies that much is still to be found wanting in the whole new theory.

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At the Brooklyn Children's Museum, young "specialists" are encouraged to give lantern-slide lectures on their hobbies at the museum, and sometimes later at school.

ZOOLOGY

Bears Go Off Relief

Familiar Pets of Yellowstone Will no Longer be Allowed to Panhandle; It is Bad for the Animals

By DR. FRANK THONE

BEARS in Yellowstone and other northern National Parks are going into winter quarters. They are fat, lazy, good-natured, for they are at the end of another summer of high feeding, and they have thoroughly padded their ribs with the layers of fuel-food that will be needed to keep their low-banked fires of life smoldering while they sleep the long weeks away. "As fat as a bear" is a wholly accurate folk-simile, in the late autumn.

But five months or so hence, when they will be coming out of their dens, the simile will have to change. Then it will be "as hungry as a bear," and "as cross as a bear," too. The National Park bruins will come out with bunkers empty, ribs lean, stomachs hollow and fairly yelling for food. Bears are pleasant enough fellows in the autumn, not quite so nice in the spring.

The National Park bears will not find their spring breakfasts so easy to get, in future, as they and their ancestors for several generations have in the past. For Uncle Sam is taking them off relief, depriving them of their dole of assorted garbage which they have come to take for granted as part of their natural and inalienable rights. Zoologists of the National Park Service are insisting that the bears, for their own good and for the ultimate better entertainment and instruction of the traveling public, become rugged individualists.

So the bears, though they may growl about the new order of things, will in the end have to join their own back-to-the-land movement, leaving the fat pickings they get as hangers-on around the "big towns" of human habitations—hotel backyards and auto campsites—to go out and rustle their own grubs.

They Really Do

That latter isn't a misprint; the plural is deliberate. For bears in their natural state do subsist to a very considerable extent on grubs — insect larvae — which they get by ripping the bark off rotten logs, rooting around in the ground, scraping aside dead leaves, etc. They also eat the fleshy roots and bulbs of plants, which again requires a certain amount of exertion. When they raid a bee-tree they eat the brood-comb as well as the honey.

It is all excellent, clean, wholesome bear food, and to get it the bears have to do a certain amount of work, enough work to keep in pretty good physical trim. All around, the natural way of life is the best way of life for the bears.

There is, moreover, no need for keeping the bears on a dole of hand-out scraps. The wilderness affords him plenty of opportunities to make his own living. For him, the frontier has not yet ceased to exist, as it has for many of our own less lucky species.

Not Intentional

As a matter of fact, the bears never were intentionally put on a dole basis. They merely took lazy advantage of a natural development. In the early days of Yellowstone Park, when hotels and camps began to be opened up, garbage from the kitchens was disposed of merely by hauling it out a discreet distance into the woods and dumping it, after the fashion of the go-as-you-please disposal of waste in the cities of that day.

The bears found the dumps (they could harly help it, having noses), and since a bear is not at all finicky about what he eats, they all straightway forsook the industrious but none too easy ways of living they and their forefathers had been used to following, and proceeded to batten on these easy pickings.

Easy Sightseeing, Too

Easy pickings in provender for the bears quickly became easy pickings in sightseeing for the tourists. Instead of having to rely on good luck and quick observation, as they do if they want to see deer, elk or almost any other of the animals in the parks, they could go in batches to the dumps, and there see bears in batches. "Visiting the bear dump" (the place was never called a garbage dump) got to be a regular part of the sightseeing routine.

The tourists usually went when the hotel garbage wagons were taking out their unsavory loads, for the bears had also got used to eating by the clock, and would assemble at their malodorous feeding grounds every night about dusk. The custom became so firmly established that the National Park Service even built substantial wooden platforms where the bears could feed, and (as a largely superfluous precaution) stationed a ranger with a high-power rifle at each one of

FOR DRINK OR BATH?

Intended to provide drinking water for tourists, this fountain is appropriated by Bruin.

THE HANDOUT

them, just for safety's sake in case some old grizzly should run amuck.

But as scientific undertanding of the National Parks' wildlife increased, it began to be apparent that this business of letting the bears eat up the garbage was not the harmless matter it had at first been supposed. It was bad for the bears, and it frequently was very bad for the tourists.

First and foremost, it taught the bears both bad habits and bad manners. The kind of food a bear gets at a garbage dump is not wholesome for him. It is too concentrated, and the manner of serving it relieves him of the exercise he needs. The bear's feeding habits become almost humanly bad, and he hasn't the recourse to the costly but efficient medical and other corrective care we turn to when we have been overstuffing and underexercising.

Bad Table Manners

Moreover, the bears' manners were demoralized. Instead of each bear feeding by himself and not interfering with others, they all crowded together like pigs in a pen. The bigger bears pushed and cuffed the smaller ones aside, the males ungallantly shouldered the females away from the best bites, and the grizzlies tyrannized it over the black bears. It was unedifying to the spectators, too, and gave them a false idea of bear behavior.

Some of the smaller, weaker bears, discouraged of ever satisfying their hunger at these monopolized dumps, wandered off to the roadsides and began to cadge food from passing cars and busses. They were popularly known as hold-up bears, but really they were nothing so brisk and bold as bandits. They were hand-out bears, beggar bears. Their scrawny, runty appearance gave them away for what they really were.

One of the first of these misnamed hold-up bears was given the soubriquet "Jesse James" by the rangers. But one spring "Jesse" turned up with twin cubs. Thereafter the name was changed to "Jessica."

Clawing for Food

Another element of bad manners learned by the bears at the dumps and in the neighborhood of settlements was over-familiarity with human beings. They would come begging to the back doors of kitchens, and even though they were usually not vicious they often severely injured people by just importunately pawing at them for food, as a dog might paw at you for a bone. After all, if an animal weighs in the neighborhood of a quarter of a ton, even a mild dab with a clawed forefoot can do a lot of damage.

Bears, taught too much familiarity wth humankind, took to raiding auto tourists' camp supplies, frequently doing the cars and tents a great deal of damage. This naturally caused a lot of bad scares, and since the Park Service could not undertake to compensate car owners for the mischief done there were some tourists who went home with anything but good will toward the parks.

There was one man, some years ago, who felt no resentment toward the Park Service because a bear had clawed his car up to get at his sugar and bacon—but he was "plenty sore at that bear," and he vowed he'd get even. A couple of weeks later he turned up again, and camped in the same place. The ranger at the camp saw he was busying himself with some wires around his car, but paid no particular attention.

When it got good and dark, the bear came back for his nightly raid. He shuffled and snorted through the night to the car that gave off such a tempting aroma of bacon and sugar. He found it —and instantly departed with a roar of shock and terror; tearing through the camp like a young tornado.

Didn't Touch Him

The ranger sought the car owner, whom he found grinning broadly. "What did you do to that bear?" he demanded.

"Not a thing," the man protested. "Didn't lay a finger on him."

"Well, you must have done something," the ranger insisted. "Bears don't act that way without any cause at all. Let me see your car."

Still grinning, the man led the way. His car had wires strung all over it, so arranged that when the bear touched one of them he would get the full strength of the battery through his body to the ground.

The next morning, the car owner contentedly unwired his car and drove out of the park again. Revenge had been sweet.

Subsequently, a ranger at a Park fish hatchery used the same trick for the discomfiture of a bear that had been stealing trout kept for the breeding stock.

Put Behind Bars

These night-raiding bears are not tolerated long in their misdeeds, however. If they show that they are going to become professional burglars, they are marked for removal. Each park that has bears also has a live-trap, consisting of a small cage with a sliding door, and usually mounted on wheels. The bear, enticed by an especially luscious bait, ventures in. Down drops the door. The trap is too narrow for the bear to turn round and try to pry it open again, so the luckless animal's days of freedom are numbered. In the morning the wheeled trap is hooked behind a truck, and the journey to some city zoological park enters on its first stage. The burglar must spend the rest of his life behind bars.

Of course, if the offender has proven himself to be really vicious (more often the case with griz- (*Turn to Page* 314)

ASTRONOMY

Movies of Sun Eruptions Made With Tower Telescope

WITH light reflected from the top of a tower forty feet high, astronomers at the McMath-Hulbert Observatory of the University of Michigan will soon be able to make movies of the sun in the light of a single glowing element in its atmosphere. In this way they will record the solar prominences, great flame-like masses of hydrogen that often shoot out from the sun's surface to heights of hundreds of thousands of miles, and solar "bombs" that are occasionally projected high above its surface and then explode.

The tower telescope, now being constructed under the supervision of Robert R. McMath, one of the founders of the observatory, will have two flat mirrors at the top to pick up the sun's light. One will turn with the earth, so as to follow the sun across the sky. The other will reflect the light into a lens immediately below, and this in turn will form a four-inch image of the sun in a building on the ground. Underneath, a pit thirty feet deep will hold the spectroscope through which the sun's light can be analyzed. Similar telescopes have been built at the Mt. Wilson Observatory in California, and in Potsdam, Germany, Arcetri, Italy, and Kyoto, Japan.

Science News Letter, November 16, 1935

MEDICINE

Surgeon Warns Against Home Remedies for Burns

WARNING against old-fashioned home remedies for burns, such as smearing the burn with butter, grease, ointment, oils or even that old stand-by, Carron oil, was issued by Dr. A. B. Bettman of the University of Oregon Medical School at the meeting of the American College of Surgeons.

Such remedies may make serious burns more serious, Dr. Bettman declared. In minor burns such treatment may do no harm, but as Dr. Bettman put it, "it is a case of the burn getting better in spite of the treatment."

"At the present time," he said, "physicians have learned that the best treatment for a serious burn is to give the patient a narcotic, remove the burned tissue, and apply, first a 5 per cent. solution of tannic acid, and then, immediately, a 10 per cent. solution of silver nitrate. This forms, almost instantly, a black, leather-like, antiseptic, protective dressing. This is dried quickly and kept dry. No other dressing is applied."

After the actual burns are dressed there must be a comprehensive program of treatment for the patient.

As to first-aid measures in case of burns Dr. Bettman advised:

"The best and safest procedure in extensive burns is to call a physician immediately, in the meantime keeping the patient warm, and if no tannic acid solution is available, to make frequent applications of strong tea, freshly brewed with from eight to ten heaping teaspoonfuls of tea leaves to a pint of water. Non-greasy, tannic acid pastes are also of value."

Science News Letter, November 16, 1935

PHYSIOLOGY

Feeding Experiments Show Excess Vitamin D Harmless

TAKING large amounts of rickets-preventing vitamin D into the body causes no harm whatever, it is indicated in recent research by Dr. Harry Steenbock, the Wisconsin University scientist whose research has led to irradiation of food products to increase their vitamin D content.

With irradiation of food products becoming increasingly popular, there is a possibility that many persons consume vitamin D in excess of their needs. Since this vitamin increases the power of the body to fix calcium, it has been a matter of considerable speculation whether this element may be fixed in injurious amounts, or whether the vitamin D may have other undesirable effects.

Dr. Steenbock conducted feeding trials with experimental animals over a ten-month period, allowing them to consume vitamin D in far greater amounts than human beings are ever likely to. While commercial irradiated milk usually contains about 50 Steenbock units of the vitamin per quart, the Wisconsin investigator used milks varying in potency from this figure up to 5,000 units per quart.

All the common methods of fortifying milk with additional vitamin D were employed. Some milks were laboratory irradiated, others were produced by cows fed irradiated yeast, and still others supplemented with irradiated ergosterol and cod liver oil concentrated.

The experimental animals were given no other food than vitamin D milk to which small amounts of iron, copper, and manganese were added. They were given all they could drink during the ten-month period.

All the animals grew well, were uniform in appearance, and showed no evidence of abnormality whatever.

Science News Letter, November 16, 1935

IN SCIEN

MEDICINE

Vaccines for Infantile Paralysis Unsatisfactory

PRODUCTION of a satisfactory and certain vaccine against infantile paralysis has not yet been achieved, it appears from a report of Dr. Simon Flexner, former director of the Rockefeller Institute for Medical Research. (*Science*, Nov. 1)

The report indicates that neither of the two infantile paralysis vaccines which are given the chief trials today can be expected to succeed. Extensive experiments have convinced Dr. Flexner that no method has yet been found for producing a safe and certain vaccine.

The efforts to find a way of protecting children from the dreaded disease date back to a discovery made by Dr. Flexner and an associate, Dr. P. A. Lewis, in 1910. At that time they found that macacus monkeys could be given active immunity or resistance to the disease by successive injections under their skins of some of the living virus which causes the disease.

A proportion of the monkeys, however, instead of becoming immune to the disease always became paralyzed.

Ever since, scientists have been trying to treat the virus so that it would give immunity without ever causing paralysis. The methods tried have been chemical treatment of the virus, heating it, and passage through monkeys.

None of these has been successful, in Dr. Flexner's opinion. Treatment with injurious chemical and physical agents either destroys the virus or reduces its concentration, he explains. If the virus is destroyed, it no longer has the power of producing immunity or resistance to the disease. If it is merely reduced in concentration, it immunizes certain animals and may paralyze others.

"No evidence exists showing that passage of the virus through monkeys removes its power to infect and produce paralysis in man," Dr. Flexner states. "On the contrary, we possess convincing observations which show that an indeterminate number of passages of virus through human beings does not deprive it of its potential paralyzing effect when injected into monkeys."

Science News Letter, November 16, 1935

FIELDS

BOTANY

Wild Wheat is Found Near Mountain of Noah's Ark

WILD wheat, in many distinct varieties, has been found growing on the foothills of the Ararat region in Armenia, not far from the mountain where, according to tradition, Noah's ark docked after its long and stormy voyage.

The authorities of the Armenian Autonomous Soviet Socialist Republic have set aside the area as a scientific reserve, not to be cultivated or grazed, because of the value of such wild wheat varieties in the study of the origin of cultivated wheats, and also in genetic experiments looking to the improvement of the cultivated varieties in resistance to frost and drought.

Science News Letter, November 16, 1935

ETHNOLOGY

If Redfern Lives He May Have Met a Strange People

IF AVIATOR Paul Redfern is actually rescued from an eight-year captivity in the hands of South American jungle Indians, he may bring back to civilization new knowledge of an unknown people.

Trio Indians, whose captive the aviator is, according to one report, are a tribe that has escaped first-hand scientific study. They are known vaguely as one of the tribes of fierce Carib Indian stock. Living far in the tropical forest of Dutch Guiana or near its southern border, they are presumed to use food and other materials similar to neighbor tribes. But so far as their beliefs and customs go, these may be distinctive.

If Redfern is indeed a cripple hidden among these Indians, treated as a white god who fell from the sky, he has had opportunity to learn about them.

There are some real cannibals in isolated parts of this jungle world, says an ethnologist of the U. S. National Museum. Poisoning is something of an art. Poisoned arrows and poisoned drinks are real dangers of life there. Typical Indians of the region live in thatched homes, depend heavily on cassava root for "bread." Men eat together, apart from their women folk.

Curious customs have been reported by those who have studied some of these jungle tribes. At the U. S. National Museum is a pair of extraordinary marriage bracelets brought back from the region in 1858 by naval officers. By daring to wear these, a young Indian would prove his worthiness for marriage. The wristlets look harmless enough, but before the aspiring bridegroom put them on, they were filled with stinging ants of a most vicious kind. Bravely wearing them, the suitor would dance from one end of the village to the other, pausing before each house. If he did not flinch in his grim dance, he was "approved."

Between the Indians supposed to be holding Redfern captive and civilization are remarkable natives of a different sort. These are the Djukas or Bush negroes. Transplanted from Africa to Guiana in slave trading days, these negroes escaped and buried themselves in the jungle. There they live more or less African lives on American soil.

A scientific expedition which succeeded in studying the Bush Negroes a few years back, found them still decorating benches, combs, and other possessions with art that suggests old Africa. They send long-distance messages by African drum telegraph, and follow witch-doctor practices.

Reports of the white man captive among the Indians in this South American region say that Bush Negroes and Trio Indians are notedly hostile to one another, and that these formidable one-time Africans would have served as an effective barrier to his escape by overland travel. Even if Trio Indians were willing to bring a white man out of their country, it is pointed out, they would not run the gantlet of their enemies.

Science News Letter, November 16, 1935

EUGENICS

Blood Test Required for Marriage in Connecticut

AFTER the first of January, all applicants for a marriage license in the State of Connecticut must pass a Wasserman or Kahn test before a license will be granted. The certificate must be based on a blood examination by an approved laboratory.

The blood examination will exclude the possibility of the dreaded venereal disease, syphilis, which in certain stages is readily communicable.

Other states requiring medical examination upon the issuance of a marriage license are Wisconsin, Oregon, North Dakota, Alabama, Wyoming and Louisiana. North Carolina repealed its law this year.

Science News Letter, November 16, 1935

AERONAUTICS

Soviet Pilot Balloon Reaches 18.3 Mile Height

A SMALL pilot balloon bearing automatic recording instruments has ascended to a height of 18.3 miles—a new record for Russian work in this field—at the Institute of Aerology in Slutsk.

At an altitude of eight miles the temperature registered by the device was seventy degrees below zero Fahrenheit.

At 11.8 miles the temperature rose to minus 58 degrees Fahrenheit; at 16.7 miles it was minus 52. From this last point to the maximum at 18.3 miles the temperature stayed constant.

Science News Letter, November 16, 1935

PALEONTOLOGY

Bones of Bird-Footed Dinosaur in U. S. Museum

BONES of a "late-model" dinosaur, that lived when these monster reptiles were passing out of biological fashion some 120 million years ago, have been brought to the U. S. National Museum by Charles W. Gilmore, curator of vertebrate paleontology. Although its live weight was probably about three-quarters of a ton, the creature was built very much along the lines of a running bird, and had bird-like feet, with three toes each.

This modeling for speed and relatively light weight, Mr. Gilmore explains, may have been due to the need for greater speed in the later days of dinosaurian domination, when competition had become severe and race-survival was to the swift. The loss of two toes out of the standard set of five possessed by earlier dinosaurs was one important item in this evolution toward greater speed in running. The same thing has happened among running mammals, reaching an extreme in the horse, which has only one working toe on each foot.

Mr. Gilmore's find is rated as a great rarity, for these bird-like dinosaurs were apparently never abundant. The bones are still in the "raw" state, as found, so that it is not known how complete the skeleton is. But it seems to be a much more nearly complete specimen than those now in museums, which are usually assembled out of the fragments of several different skeletons.

Along with the fossils of the bird-like dinosaur Mr. Gilmore found the remains of duckbill dinosaurs, horned dinosaurs, armored dinosaurs, and extinct genera of turtles and crocodiles.

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From Page 311

zlies than with the blacks), the sentence is death, executed by a ranger with a rifle. The destination then is a museum instead of a zoological park. It is too bad that the bear must die for having learned bad manners under unnatural conditions of life—but when it comes to that, we often do as much to each other.

A further disadvantage to the bears of feeding on garbage is not so readily realized by the traveling public as by the scientists. Bears, like the rest of us, are subject to diseases. And like the rest of us, they may pass their diseases around more readily under unnatural crowded conditions. Moreover, there is always the risk of some new and strange malady lurking in the garbage itself, ready to take hold on the bear population but impossible to wipe out again once it became established.

These and other considerations, then, decided the officers of the National Park Service. The garbage-feeding must be eliminated. They realized, of course, that it could not be done at one fell swoop. Both bears and tourists had become too accustomed to it. So they have kept two feeding-platforms open in Yellowstone Park, out of the odd half-dozen that used to be there. But everywhere else, Bruin has been put strictly on his own resources.

The results thus far have abundantly justified the policy. There have been less than half as many complaints of raids on campers' supplies, the beggar-bear nuisance around the kitchen doors has been abated, and the bear population is beginning to look healthier, sleeker, better fed, more nearly normal.

Turned out to make his own living, in a land where a living can still be made, Bruin has prospered.

Science News Letter, November 16, 1935

ARCHAEOLOGY

'He-Men' Wore Make-up And Hair Curlers In Egypt

Clues to Middle Class Life in 1500 B.C. Have Been Found Preserved in Tomb of Princess' Secretary

BIG HULKING he-men of Egypt, back in 1500 B.C., wore make-up. They darkened the eyes to make them large and interesting. They waved their hair with hair curlers, too.

So American archaeologists have learned by digging at Thebes where they have explored the family tomb of Crown Princess Hatshepsut's private secretary.

Results of the Metropolitan Museum of Art Egyptian Expedition, announced recently, give prime importance to the new knowledge of life and tastes of middleclass Egyptians revealed in undisturbed depths of this tomb.

Nefer-Khewet, the man who was a chief secretary to Hatshepsut before she became Egypt's feminist queen, had one royal gift from his employer to display. This is a large alabaster vase marked with the Princess' name and title.

Not only Nefer-Khewet but ten members of his family, including five poor relations, came to be buried one by one in the tomb.

Telling of the many personal belongings removed from the tomb, William C. Hayes of the expedition points out that the numerous personal weapons suggest the war spirit in Egypt when this family lived. The aged secretary had a bow, a sheaf of bronze-tipped arrows, two quarterstaves, and three single-sticks. His powerfully-built son, or son-in-law, named Boki, had a fine bronze battle-axe and a long boomerang.

The secretary's office equipment—bronze knives and carbon for making ink—were found. Game boards, for "robbers" and other games like parchesi, show how the family amused itself at night. Jewel boxes and baskets with the women's things contain carved wooden hairpins, bronze mirrors, wooden combs, and polished ebony sticks for applying to the eyes the dark cosmetic called kohl.

Men used kohl, too, says Mr. Hayes: "Even the great hulking Boki had, in addition to his various lethal weapons and other items of manly equipment, a delicately carved, 'four-barreled' kohl container of ebony, inlaid with ivory and fitted with a swivel lid."

Burials of the poor relations are described by the archaeologists as shoddy and pathetic in their carelessness. The one best provided for was found in a borrowed coffin.

Even with respected members of the family, curious mishaps occurred. The big fellow Boki was buried up-side-down, presumably because the persons bandaging his mummy lost track of which side was front. They made bulges of padding where feet and chest should have been, but when unwrapped Boki was discovered lying on his face.

Science News Letter, November 16, 1935

PALEONTOLOGY

Extinct "Elephant-Bear" Brought to U. S. Museum

BONES of a great beast that looked like a bear, had feet rather like an elephant's, but was not very nearly related to either animal, have been brought to the Smithsonian Institution by Charles W. Gilmore, curator of vertebrate paleontology, who found the fossils in the Big Horn Basin region in Wyoming. The skeleton is still embedded in a matrix of stone, and many months of work will be required to chisel it out and study and assemble the bones.

The creature, known to scientists as Coryphodon, was heavy-bodied like a tapir and not quite so high at the shoulder as an ox. It probably was pretty much "boss" in its day, some sixty million years ago, for its great bulk was reinforced by a pair of formidable eight-inch tusks in its jaws.

Coryphodon's foot bones are what especially intrigue scientists. The animal neither walked flat-footed like a bear nor up on the ends of its thick toes like a modern elephant. It seems to have been progressing in the latter direction, however, especially in its forefeet, which bore the greater part of its weight. Its gait probably was a slow shuffle, like that of the modern elephant.

In the same region where the elephant-bear flourished there lived also the earlier types of horses. The latter line has survived, while the bigger, more dominant brute has perished. Mr. Gilmore suggests that the horse-ancestors made up for their lesser bulk and fighting ability by greater agility and brain capacity, and therefore greater adaptability. The elephant-bear, a stubborn conservative, was beaten by a changing world which it could neither understand nor get used to.

Science News Letter, November 16, 1935

The peach mosaic disease, which has invaded orchards in Colorado and Texas, is now discovered in California.

For the Man of Science

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SEISMOLOGY

Difficulties Encountered In Prediction of Earthquakes

By N. H. HECK, Chief, Division of Terrestrial Magnetism and Seismology, U. S. Coast and Geodetic Survey.

AFTER the earthquake of November 1, which shook most of the cities in the northern part of the United States from Maine to Wisconsin, all available seismologists were asked for opinions as to whether further shocks might be expected. While most of the statements were qualified, nearly all agreed that there would probably be further shocks, though felt over a lesser area than the main shock.

Now no reputable seismologist will venture an earthquake prediction. Why then was there willingness to express opinions in this case? It was because all great shocks are followed by aftershocks, and because of knowledge of the performance in individual earthquakes in the same region.

While we do not know the ultimate cause of earthquake, we do know something of the mechanism by which they probably occur. A slipping occurs somewhere deep in the earth and elastic waves which we recognize as earthquake waves go out. Now the slipping is for the purpose of relieving strain in the rock. If the slipping in the first shock is nearly the amount required to relieve the strain, the aftershocks will be unimportant. More usually it is too little or too much, and the adjustment is completed by further slipping, accompanied by strong aftershocks.

May Be None

So far it appears that the first shock on November 1 nearly completed the adjustment, since there have been no aftershocks felt outside of Ontario and Quebec. The last Canadian earthquake of importance in February, 1925, had no important aftershocks.

One difficulty of the seismologist in making an explanation to the public is that each person is interested primarily in one place and wants to know whether a further earthquake will be felt in that place. This is just the information that cannot be given and a simple illustration will show why.

Suppose that stones are dropped into a pond from a height of ten feet and that there is an observer at the opposite side of the pond and another in a boat at rest somewhere in the pond. The waves or ripples have to be of a certain size to be observed and their size depends on the size of the stone. At the far side of the pond only the waves from a large stone will be seen. At the boat many from smaller stones will be seen. The ripples from very small stones will be seen only if the boat comes close.

It then can be said that since the earthquake occurred east of Lake Huron in Canada, 550 miles from Washington, only a shock equal to the first would be likely to be felt in Washington, but the probability of a shock being felt in New York and Michigan cities would be much greater. The case is not so simple as for the pond but still the analogy holds fairly well. It is not possible to say how far any particular shock may reach.

Swarm Earthquakes

The case of the recent Montana earthquake is quite different. Though one of the shocks occurred just twelve hours before the Canadian shock there is no relation between them and their characteristics are totally different. This belongs to the unusual type of swarm earthquakes. There have been nearly 800 shocks, according to the local Weather Bureau station at Helena, of which three have been severe and two of them destructive. With strong shocks on October 12, 18 and 31, the proper prediction is that so long as the swarm earthquakes continue fairly strong shocks are likely to be interspersed among them.

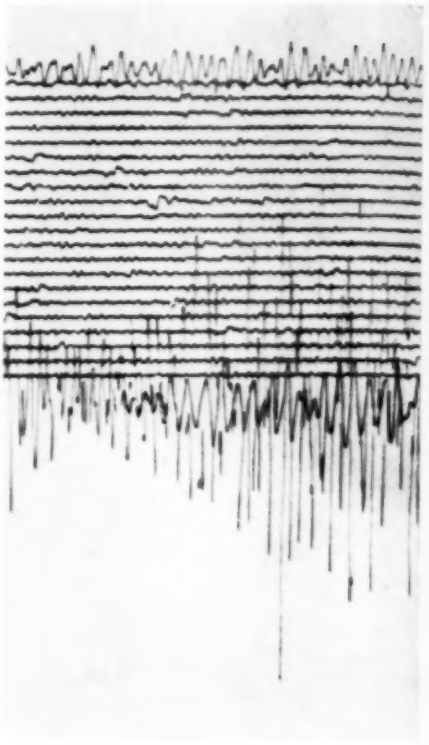
Science News Letter, November 16, 1935

RADIO

Tuesday, November 19, 4:30 p. m., E.S.T.
A NATIONAL HEALTH SURVEY, by Surgeon General Hugh S. Cumming, U. S. Public Health Service.

Tuesday, November 26, 4:30 p. m., E.S.T.
OCEANS AROUND US, by Capt. Jean H. Hawley, Assistant Director, U. S. Coast and Geodetic Survey.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.



EARTHQUAKES

The seismograph at Canisius College, Buffalo, enables two earthquakes to write their own records. The top line shows the end of the Montana disturbance. The larger disturbance at the bottom of the record is the nearer Canadian quake.

PHYSIOLOGY

Body Fatigue Studied at Altitude of 20,140 Feet

ALL ALTITUDE records for scientific expeditions working on terra firma were broken last summer by scientists of the Harvard Fatigue Laboratory who worked in the Andes Mountains of northern Chile, according to a preliminary report by Dr. Ancel Keys, the expedition director.

Much of the research on the effects of altitude on heart action, vision and mental alertness was carried out at an elevation of 20,140 feet above sea level, some five thousand feet higher than the previous record, made in the Italian Alps.

Due to the rarity of the atmosphere and lack of oxygen, members of the expedition were unable to walk fast at the 20,000 foot level, but a well-adapted person could do steady physical work for hours at a stretch.

In general the men became adapted to the height easily but their capacity for intense work was noticeably decreased as the oxygen content of the air became lowered.

Science News Letter, November 16, 1935

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PHYSICS

Scientists Obtain Sample of Air 13 Miles Above Earth

TINY evacuated glass vials the size of medicine droppers are being used to trap samples of the air 13 miles in the stratosphere, according to the report of Prof. F. A. Paneth and E. Glückauf. (*Nature*, Nov. 2)

The evacuated glass tubes are sent aloft from the upper air section of the Kew Observatory on small sounding balloons; broken at a predetermined height, they catch a sample of the atmosphere and then are sealed up again after fifteen seconds.

The object of the tests is to check the kind of gases which make up the stratosphere at heights where the compositions will be fairly stable and not disturbed by the winds creating turbulence at lower levels.

Extremely sensitive chemical analysis is used to measure the amount of helium gas present in the sample, for the sample contains only a few cubic centimeters altogether. An accuracy of one per cent. in a total volume of two cubic centimeters is attained, it is claimed.

First finding of the work disclosed that at a height of 13 miles the stratosphere air contains eight per cent. more helium than at the earth's surface.

Because of the fact that air is a mixture of gases the composition of the atmosphere at great heights should vary with the altitude.

The best way of checking this fact, report Prof. Paneth and his colleague, would be to measure by chemical analysis the hydrogen content of the air in the stratosphere. The proportion of hydrogen is too low, however, to enable the use of any present methods.

The next best indicator possible is the helium content.

To reach altitudes greater than twelve miles with the equipment, weight must be kept down, and as a result only small samples of the air can be taken. The sample apparatus is dropped to earth on a small parachute.

It is found that up to heights of 11.18 miles (18 kilometers) the mixing of the gases has not yet given place to diffusion but at 13.05 miles (21 kilometers) eight per cent. more helium exists than is found at sea level.

Much more research is needed on the problem, state the scientists, urging cooperation. Six cubic centimeter samples are requested from workers in better climates in other parts of the world.

Science News Letter, November 16, 1935

MEDICINE

Stomach Ulcer is Symptom of General Abnormal Condition

STOMACH ulcer is only a symptom of a more general abnormal condition, Dr. Alton Ochsner, professor of surgery at Tulane University School of Medicine, told the American College of Surgeons.

Some people may be predisposed to ulcers by their constitutional make-up, or the tissues of their body may be especially susceptible to ulcer formation. In these persons, the development of stomach ulcers may be precipitated by abundant secretion of the stomach juices, by over-acidity, by focal injections elsewhere in the body, or by injury to the tissues of the stomach and digestive tract.

These conclusions as to the cause of stomach ulcer are based on lengthy research by Dr. Ochsner and his associates, Drs. Mims Gage and Kiyoshi Hosoi, and on researches by other workers in the United States and Europe.

No method is known at present for overcoming the factors that predispose to ulcer, so the only choice is to avoid conditions which tend to bring on the trouble in predisposed persons.

Persons subject to ulcers must change their habits of living for the course of their lifetime, the Tulane investigators advise, pointing out that while surgical treatment may be of value in some complications resulting from ulcer, it will not change the nature of an individual predisposed to ulcer.

Among the habits that must be avoid-

ed, in the opinion of these scientists, are those that tend to increase the secretion of the stomach juices or the acidity of that organ. Smoking, especially of cigarettes, alcohol, and the use of condiments with food are to be avoided.

Frequent small feedings were advised to neutralize gastric acidity in persons subject to ulcer. Sodium bicarbonate is not an efficient neutralizing agent for this purpose. Calcium carbonate is better, it was stated.

All foci of infection should be removed because they tend to stimulate the formation of ulcers both directly and indirectly. Roughage in food should be avoided in order to lessen the possibility of injuring the digestive tract.

The complications for which Dr. Ochsner considers surgical treatment valuable are mechanical obstruction of the digestive tract, perforation of the stomach wall, repeated hemorrhages, or danger of cancer.

Science News Letter, November 16, 1935

ASTRONOMY

Billion Degree Heat Needed To Explain Stars' Radiation

UNLESS the interiors of stars are almost entirely made of iron, their internal temperatures must be as much as 1,000,000,000 degrees Kelvin (about 1,800,000,000 degrees Fahrenheit), Dr. T. E. Sterne, astrophysicist of Harvard College Observatory, told the Electrochemical Society.

The outside surface of the sun, the hottest matter at which science can get a good look, is by comparison only about 6,000 degrees on the same temperature scale, Dr. Sterne indicated. The estimated outside temperature of other stars range from 1,650 degrees for very red stars to 35,000 degrees for those known as Class O.

These new estimates of internal star temperatures, Dr. Sterne pointed out, come from the theories of Prof. E. A. Milne of Oxford University. They exceed by a factor of 100 times the previously-held concepts of Sir Arthur Eddington of Cambridge University that the inside temperatures of ordinary stars were "merely" about 10,000,000 degrees.

Only in the case where a star is very dense, as in the baffling "white dwarf" type like the companion of Sirius, is the extra high temperature not needed, Dr. Sterne indicated. The white dwarfs have an average density 61,000 times as great as water and at their center matter probably weighs as much as five tons to the cubic inch. For such dense stars the theory of Prof. Milne yields a central temperature about like the theory of Prof. Eddington's—tens of millions instead of billions of degrees.

The staggering problem of internal star temperature is an essential part of one of the most important problems of astrophysics—the question of determining a reasonable mechanism which would create the enormous amount of radiant energy that the stars have been wastefully pouring out into interstellar space for at least 100,000,000 years.

In view of the findings of recent experiments on artificial transmutation of the chemical elements in laboratories, transmutation of elements from one to another within the centers of stars appears to offer the most reasonable explanation of great outpouring of stellar energy, Dr. Sterne indicated.

While the outsides of stars are constantly radiating energy into space, and consequently are not in equilibrium with their surroundings, the interior of stars might present a situation of approximate statistical equilibrium which is essential for a starting point on even the most fragmentary theory of star energy, said Dr. Sterne.

At temperatures of billions of degrees transmutations conceivably would be completely reversible with the elements changing from one to another in millionths of a second and liberating vast quantities of energy in the process.

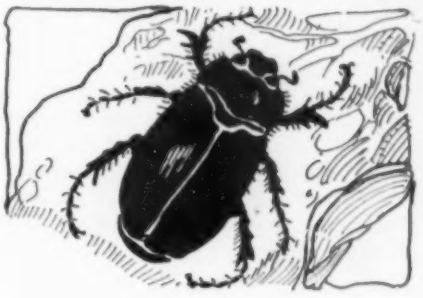
Eddington's estimates of 10,000,000 degrees for internal star temperatures would not be sufficient for such reversible transmutations to be maintained, said Dr. Sterne. A billion degrees, and more, are needed to explain the energy output, unless the stars consist almost wholly of iron atoms which, theoretically, cannot be transmuted into other elements, without absorbing energy instead of liberating it.

Science News Letter, November 16, 1935

A New York State experiment station points out the importance of completely filling bottles when bottling grape, apple or cherry juice, because air in the top affects flavor and color.

CHEMISTRY

NATURE RAMBLINGS
by Frank Thone



Chitin

MILADY now wears dainty hose made out of wood, and drives a car painted with a preparation of cotton. Tomorrow she may be shod with beetles' wings, and serve party refreshments off a lobster-shell tray.

Rayon, synthetic lacquers and a thousand other things made from wood and cotton cellulose are now chemical commonplaces. We no longer even stop to wonder at them.

But chitin, the animal analogue of cellulose, is still a neglected possibility. This stuff, which is found practically throughout the invertebrate animal world, forms such things as the wings and body-shells of insects, and the thick crusty armor of crabs and lobsters. It contains carbon and hydrogen in about the same proportions as they are found in cellulose, but it has less oxygen than cellulose has, and it also contains nitrogen which cellulose lacks.

But it is as susceptible as cellulose to chemical manipulation, and if industrial chemists were sufficiently interested could doubtless be converted into many of the same things that now are born by the shipload from cellulose: synthetic fabrics, lacquers, plastics, transparent wrappings. Little has been done with chitin (pronounce it *KY*-tin), even by laboratory chemists; nothing, apparently, with a view to possible commercial applications.

There is no lack of raw material. The lobster, crabmeat, and shrimp packing industries turn out mountains of discarded shells every season, which are now just plain waste, to be got rid of. These would have to be treated with acid, to extract the lime they contain, before they could be used, but that would not present any serious difficulty; acids are cheap.

Science News Letter, November 16, 1935

•First Glances at New Books

Physics

EXPLORING IN PHYSICS—Reginald J. Stephenson — *Univ. of Chicago Press,* 205 p., $1.50. Companion volume to the University of Chicago's text on physics *From Galileo to Cosmic Rays* by Prof. Lemon. *Exploring in Physics* uses the same type of clever illustration and makeup but concentrates on examples and problems used in the newly established introductory course in the general science at the University. Studying physics can now, at least at the start, be made a pleasure.

Science News Letter, November 16, 1935

Medicine

THE DOCTOR AND THE PUBLIC—James P. Warbasse, M.D.—*Paul B. Hoeber,* 572 p., $5. The author devotes a large part of this book to telling the history of medicine as a basis for better understanding of present day medico-economic and medico-sociologic problems, which take up the concluding chapters.

Science News Letter, November 16, 1935

Chemistry

POPOFF'S QUANTITATIVE ANALYSIS, 3rd Ed.—Stephen Popoff; Revised by Murray J. Rice and Warren P. Cortelyou —*Blakiston's,* 555 p., $4. A new revision of this popular chemistry text finds a different arrangement of the material in what is hoped will be a more popular form. Particular emphasis is placed on separation of the subject matter into units which can be interchanged to fit the needs of the average and exceptional student. The chapter on unit operations is not usually found in chemistry. In it is given in simple language a description of the various techniques of the field from adding a reagent with a pipet to sealing a stopcock.

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Psychology

THE PSYCHOLOGY OF THE AUDIENCE —H. L. Hollingsworth — *American Book Co.,* 232 p., $2.50. Public speakers have need to consider not only their subject but the audience whom they are addressing. Here you have the advice of a psychologist on how to gain, hold, impress, and influence large groups of listening people. Each chapter ends with a list of practical conclusions.

Science News Letter, November 16, 1935

Population Study

MIGRATION AND PLANES OF LIVING, 1920-1934—Carter Goodrich, Bushrod W. Allen and Marion Hayes—*Univ. of Pennsylvania Press,* 111 p., $1. In good times, America moves from locations where incomes are small to areas providing better living. In hard times, there seems to be a natural tendency to reverse the flow of the stream. Here is food for thought in connection with the Government's resettlement projects.

Science News Letter, November 16, 1935

Science

ANNUAL REPORT OF THE BOARD OF REGENTS — Smithsonian Institution — *Govt. Print Off.,* 448 p., $1. Record of another year's progress in the Smithsonian's many fields of research: solar radiations, plant physiology, American archaeology, important new museum accessions. The contributed papers are varied, and unusually interesting.

Science News Letter, November 16, 1935

Physical Education

INDIVIDUAL EXERCISES — George T. Stafford, Harry B. DeCook, Joseph L. Picard—*A. S. Barnes & Co.,* 111 p., $1. Directions, illustrated by simple line drawings, for exercises which the individual may follow to correct various conditions amenable to such treatment. The directions may be easily followed but, as the authors emphasize, the individual should consult his physician first to find which ones are best suited to his own condition.

Science News Letter, November 16, 1935

Education

GRADUATE STUDY IN UNIVERSITIES AND COLLEGES IN THE UNITED STATES —Walton C. John—(U. S. Dept. of Interior, Bulletin, 1934, No. 20), *Govt. Printing Office,* 234 p., 20c.

Science News Letter, November 16, 1935

Psychiatry

APHASIA, A CLINICAL AND PSYCHOLOGICAL STUDY—Theodore Weisenburg and Katharine E. McBride—*Commonwealth Fund,* 634 p., $5. This volume contains a wealth of material which should be both interesting and useful to psychiatrists, neurologists and psychologists. Far too technical for the lay reader, of course.

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Science

SIMPLE SCIENCE—Julian Huxley and E. N. da C. Andrade—*Harper,* 688 p., $3.50. A simple, straightforward, well-diagrammed exposition of elementary biology, physics and chemistry, with their applications to the problems of daily living. The book is decidedly in the great tradition of science popularization, which in England is inseparable with the name of an earlier Huxley. It should make an ideal Christmas present for a boy or girl of the actively inquiring 'teen age—but their parents are very likely to lug it off and read it first.

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Child Psychology

CHILD PSYCHOLOGY—George D. Stoddard and Beth L. Wellman—*Macmillan,* 419 p., $2.50. Two active research workers in this field now provide a text based directly upon experimental findings.

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Economic Geography

FUNDAMENTALS OF ECONOMIC GEOGRAPHY—Nels A. Bengston and Willem Van Royen—*Prentice-Hall,* 802 p. 300 maps and illus., $5. A very broad introductory text in college geography, stressing the "why" and "what of it" angles of world production. The authors' point of view is that geography should be basic science for all students, especially those whose major interests deal with social studies, and to provide this background is the aim of the text.

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Economics

TEXTILE PROBLEMS FOR THE CONSUMER—T. N. Carver, M. S. Woolman and E. B. McGowan—*Macmillan,* 175 p., $1.60. General discussions from the point of view of the economist (Part I), the textile specialist (Part II), and the textile teacher (Part III).

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Zoology

WILD ANIMALS—Helen Sidebotham —*Oxford University Press,* 100 plates, $2. A book of animal pictures, most of them tropical, and many of them remarkably good. All photographed from life.

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